

# PATENT ABSTRACTS OF JAPAN

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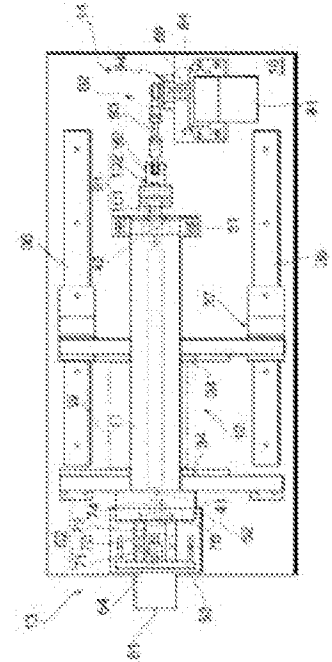
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## (54) DUST REMOVAL DEVICE AND DUST REMOVAL METHOD

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a dust removal device capable of preferably removing dust deposited on a work, and a dust removal method.

**SOLUTION:** The dust removal device 1 is provided with a rotation brush 11 for removing the dust deposited on the work W; a work conveying means 12 for conveying the work W in one direction; a brush rotation means 13 for rotating the rotation brush 11 making an axis as a center synchronous with the work conveying means 12; and a brush advancement/retreating means 14 for advancing/retreating the rotation brush 11 in a direction crossing one way, i.e., an axial direction synchronous with the work conveying means 12.



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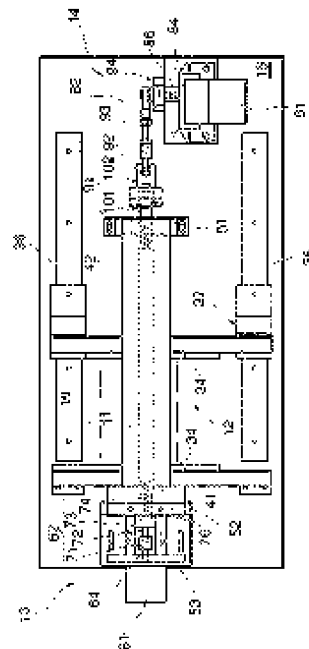
(54) 【発明の名称】 ダスト除去装置およびダスト除去方法

(57) 【要約】

【課題】 ワークに付着したダストを好適に除去することができるダスト除去装置およびダスト除去方法を提供することを課題とする。

【解決手段】 ワークWに付着したダストを除去する回転ブラシ11と、ワークWを一方方向に搬送するワーク搬送手段12と、ワーク搬送手段12に同期して、回転ブラシ11を軸心を中心に回転させるブラシ回転手段13と、ワーク搬送手段12に同期して、回転ブラシ11を軸方向であって一方方向に交差する方向に進退させるブラシ進退手段14と、を備えたダスト除去装置1である。

【選択図】 図4



## \* NOTICES \*

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- 2.\*\*\*\* shows the word which can not be translated.
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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[Field of the Invention]

[0001]

A dust stripper and a dust removal method with which this invention removes dust adhering to a work It is alike and is related.

[Background of the Invention]

[0002]

The transportation means in which this kind of dust stripper conveys various works, such as a glass substrate, conventionally, The surface of the work conveyed was contacted rotationally and it has the rotary brush which sweeps out dust adhering to this, and the dust collecting means which carries out suction removal of the dust adhering to a rotary brush with air (for example, refer to patent documents 1.). In this case, the hand of cut of the rotary brush is set up in the direction in which a rotary brush contacts a work rotationally from a direction which bars conveyance of a work.

[Patent documents 1] JP,2003-334499,A (the 2nd page and Fig. 9)

[Description of the Invention]

[Problem(s) to be Solved by the Invention]

[0003]

Although it was useful in this dust stripper in respect of miniaturizing a device and being able to remove dust effectively by taking the above-mentioned composition etc., when the description of the surface of various works, etc. were taken into consideration, the further improvement was desired at the point which fully rakes out dust adhering to this. Dust elimination operation other than the rotating operation of a rotary brush was also desired.

[0004]

This invention sets it as the purpose to provide the dust stripper and dust removal method which can remove dust adhering to a work suitably.

[Means for Solving the Problem]

[0005]

A brush from which a dust stripper of this invention removes dust adhering to a work, It has a work carrying means which conveys a work relatively to one way to a brush, and a brush transportation device to which a brush is moved to a work relatively to a direction which intersects one way synchronizing with a work carrying means.

[0006]

According to this composition, a brush carries out relative displacement to one way to a work, and synchronizing with this, a brush carries out relative displacement in the direction which crosses in this direction, and dust in which a brush adhered to a work is removed. Elimination operation (relative movements) of this new brush can be applied to the conventional dust elimination operation, and can improve application as the whole device. Since the direction of relative displacement of both a work and a brush is a 2-way, it also becomes possible to make a work carrying means and a brush transportation device into a simple structure.

[0007]

When a brush is moved about a kind of both relative displacement, conveying [ 1st ] a work, A brush may be moved [ while conveying a work to an immovable brush to the 2nd, and ] in the direction which crosses in this move direction, making the 3rd move a brush to one way to an immovable work, when moving a work in the direction which intersects this transportation direction. The 1st case [ device structure ] becomes useful at a point which does not need to be enlarged comparatively so that it may mention later.

[0008]

As a kind of work, a printed circuit board, a liquid crystal glass substrate, a flexible substrate, a ceramic substrate, a plastic sheet, a liquid crystal display panel, a vacuum tray, a lens, a light guide plate, a film, paper, etc. are mentioned, for example. Contour shape of a work may be rectangular shape and may be disc shape like a wafer mentioned later.

[0009]

In this case, as for a brush transportation device, it is preferred to make a brush move relatively in the direction which intersects said one way synchronizing with a work carrying means.

[0010]

According to this composition, since a brush moves relatively, dust can be removed more effectively. It becomes possible [ also attaining a miniaturization of a device ] for the length of the brush itself to be shortened, for example etc.

[0011]

A brush comprises a rotary brush in these cases, and it is preferred to have had further a brush pivot means which rotates a rotary brush focusing on an axial center synchronizing with a work carrying means.

[0012]

According to this composition, since dust elimination operation by rotating operation of a rotary brush is also added, dust can be more effectively removed so that dust adhering to a work may be raked out.

[0013]

As for a direction which intersects said one way in these cases, it is preferred to aim to intersect perpendicularly with one way concerned.

[0014]

According to this composition, since the two directions of relative displacement, a work and a brush, intersect perpendicularly, a work carrying means and a brush transportation device can be made into a simple structure, and device structure of these each means can be made easy to construct.

[0015]

A rotary brush from which other dust strippers of this invention remove dust adhering to a work, It has a work carrying means which conveys a work in the direction which intersects shaft orientations of a rotary brush, a

brush pivot means which rotates a rotary brush focusing on an axial center synchronizing with a work carrying means, and a brush movement means which makes a rotary brush move to shaft orientations synchronizing with a work carrying means.

[0016]

Since a rotary brush is made [ and ] to move to that shaft direction to a work conveyed according to this composition, rotating a rotary brush, dust adhering to a work can be removed more suitably. In this case, since he is trying to convey a work, workability can also be improved. In dust elimination operation, such a work conveyed is not moved further, but a brush is moved, and since it is (making it move), a miniaturization of a device can be presented as a whole.

[0017]

In this case, as for a rotary brush, it is preferred that an input part of a brush pivot means is formed in one end, and an input part of a brush movement means is formed in an end of another side.

[0018]

According to this composition, device structure can be simplified compared with a case where each end of a brush pivot means and a brush input means is concentrated and provided in an end part of a rotary brush.

[0019]

A brush pivot means transmits rotation of a motor used as a driving source and a motor to a rotary brush in these cases, and have a transmitting power means to permit an attitude of a rotary brush, and a brush movement means, It is preferred to have had an actuator used as a driving source and a transmitting power means to have changed power of an actuator into an advance and retreat movement of a rotary brush, and to have transmitted it, and to permit rotation of a rotary brush.

[0020]

According to this composition, rotation of a rotary brush by a brush pivot means becomes as [ transmit / \*\*\*\* / by a means of transmitting power of a brush movement means / to an actuator / an attitude of a rotary brush by a brush movement means is not transmitted to a motor by a means of transmitting power of a brush pivot means, and ]. Thus, a brush pivot means and the brush movement means can function suitably with suitable relevance for mutual, without barring each own operation.

[0021]

In this case, an actuator consists of motors and, as for a means of transmitting power of a brush movement means, it is preferred to consist of a reciprocating block slider crank mechanism which has a slider part which holds an end of another side of a rotary brush pivotable.

[0022]

According to this composition, a rotary brush can be made to move appropriately with a simple mechanism of a reciprocating block slider crank mechanism, and it becomes useful in respect of amplitude adjustment of an advance and retreat movement of a rotary brush, etc. compared with a case where a cylinder etc. are used for an actuator. In order that a slider part may hold a rotary brush pivotable, rotation of the above-mentioned rotary brush is permitted. It can also serve as a motor of a brush movement means by a motor of a brush pivot means, and a power branching means which branches and transmits power from a single motor to a brush pivot means and a brush movement means in that case is established again.

[0023]

In this case, a connecting rod part by which one end was connected with a slider part as for a reciprocating block slider crank mechanism, It is preferred that an end of another side of a connecting rod part is

connected, and have the crank part with which an outputting part of a motor was connected, and an adjustment device which can adjust a connecting rod part and distance between connection of a motor is built into a crank part.

[0024]

According to this composition, since a connecting rod part and distance between connection of a motor, i.e., crank length, (eccentricity) can be adjusted, the amount of attitudes of a rotary brush (amplitude) can be adjusted. Thereby, device structure according to classification of a work can be taken appropriately.

[0025]

As for a transportation direction of a work according to a work carrying means in these cases, and a moving direction of a brush by a movement means, intersecting perpendicularly is preferred.

[0026]

According to this composition, a work carrying means, a brush transportation device, and a brush pivot means are associated, it becomes easy to assemble, and device structure can be simplified and miniaturized as a whole.

[0027]

Other dust strippers of this invention are provided with a brush from which dust adhering to the surface of a disc-like work is removed, a work pivot means which rotates a work focusing on an axial center, and a brush transportation device which moves a brush to a diameter direction of a work synchronizing with a work pivot means.

[0028]

According to this composition, dust adhering to a work is removable like the above by moving a brush to a diameter direction of a work to a rotating disc-like work. As a disc-like work, a wafer, disc media, such as CD (Compact Disk), etc. are mentioned, for example.

[0029]

In this case, as for a brush transportation device, it is preferred to make a brush move to a diameter direction of a work.

[0030]

According to this composition, since a brush moves, that it can do short etc. can present a miniaturization of a device with a removing effect of dust, and the length of the brush itself.

[0031]

In this case, a brush comprises a rotary brush and it is preferred to have had further a brush pivot means which rotates a rotary brush focusing on an axial center synchronizing with a work pivot means.

[0032]

According to these composition, since dust elimination operation by rotating operation of a rotary brush is also added, dust adhering to a work can be removed more effectively.

[0033]

In this case, as for a brush, it is preferred to be constituted by work so that contact is possible.

[0034]

According to this composition, since a brush in contact with a work acts so that dust may be raked out, it can heighten a removing effect of dust extremely.

[0035]

By carrying out relative displacement of the brush which a work was made to face, a dust removal method of

this invention carries out relative displacement of the brush in the direction which crosses in this direction to a work in a dust removal method which removes dust adhering to a work, making one way carry out relative displacement of the brush.

[0036]

According to this composition, dust which adhered to a work by elimination operation (relative movements) of this new brush is removable like the above, and. In order to heighten a removing effect more, high elimination operation of application, such as being applicable to the conventional dust elimination operation, can be attained.

What is necessary is just to make a diameter direction of a work carry out relative displacement of the brush, being able to apply not only rectangular shape but a thing of disc shape, and making a hoop direction of a work carry out relative displacement of the brush in this case as a work.

[0037]

In this case, a brush comprises a rotary brush and it is preferred to make a rotary brush contact a work rotationally during relative displacement of a 2-way of a rotary brush to a work.

[0038]

Since according to this composition a work is contacted while a rotary brush rotates further, dust can be more effectively removed so that dust adhering to a work may be raked out.

[Effect of the Invention]

[0039]

According to the dust stripper and dust removal method of this invention, dust adhering to a work is suitably removable by providing the composition etc. which carry out relative displacement for a brush to a 2-way to a work.

[Best Mode of Carrying Out the Invention]

[0040]

Hereafter, with reference to an accompanying drawing, the dust stripper and dust removal method concerning the suitable embodiment of this invention are explained. Although this dust stripper removes with a brush dust which adhered on the surface of the work (upper surface), such as garbage, dust, and dust, by using various kinds of substrates as a work, in that elimination operation, it moves a brush to a 2-way relatively to a work. Below, although the general term of this kind of dust is explained as "dust", the contour shape of a work explains what has the contour shape of a work disc-like as the 2nd working example about a rectangular thing as the 1st working example.

[Work example 1]

[0041]

As shown in drawing 1 and drawing 2, the dust stripper 1 provides work processing area on the stand 3 supported by the support saddle 2 in four corners, and performs dust elimination operation to the work W (substrate) introduced into work processing area by various kinds of constituent means attached to the stand 3.

[0042]

The rotary brush 11 from which dust adhering to the work W is removed in work processing area, The brush movement means 14 and \*\* which make the rotary brush 11 move to shaft orientations synchronizing with the work carrying means 12 which conveys the work W to one way, the brush pivot means 13 which rotates the rotary brush 11 focusing on an axial center synchronizing with the work carrying means 12, and the work

carrying means 12 are allocated. These each constituent means 12, 13, and 14 are arranged in the common base 16 fixed to the upper part of the stand 3, and the transportation direction of the work W and the moving direction of the rotary brush 11 lie at right angles.

[0043]

The dust stripper 1 is provided with the dust collecting means 17 which carries out suction discharging of the dust adhering to the rotary brush 11 with air. The blowing air mechanism 21 in which the dust collecting means 17 sprays air on the work W directly, It had the dust collecting hood 22 allocated in the right above [ the rotary brush 11 ] part, and the exhaust pipe 23 connected to the dust collecting hood 22, and has the vacuum mechanism which carries out suction discharging of the dust out of work processing area with air. The air sprayed on the work W is oriented with the dust collecting hood 22 by rotation of the rotary brush 11.

[0044]

In the driving state of the dust collecting means 17 the dust elimination operation of the dust stripper 1, It is carried out by making it move, rotating the rotary brush 11 which attended the upper part focusing on an axial center, driving the brush pivot means 13 and the brush movement means 14 synchronizing with the work carrying means 12, and conveying the work W. The work W continues throughout the surface and dust is removed by this.

[0045]

Next, with reference to the Drawings after drawing 3, it explains in full detail in order of the work carrying means 12, the rotary brush 11, the brush pivot means 13, and the brush movement means 14.

[0046]

The band conveyors 31 and 31 of the right-and-left couple which conveys this while supporting the both-ends lower part of the work W, as the work carrying means 12 is shown in drawing 3 and drawing 4, The drive motors 32 and 32 of the right-and-left couple which makes each band conveyors 31 and 31 drive, It has the power transmission devices 33 and 33 of the right-and-left couple which transmits the power of each drive motors 32 and 32 to each band conveyors 31 and 31, and the guides 34 and 34 of the right-and-left couple which guides the both side surfaces of the work W conveyed. Only the guide 34 is shown by drawing 4 among this component.

[0047]

The drive motor 32 comprises a DC motor and a stepping motor with a commutator and a brush. Making the upper rotary brush 11 face the work W, and making the rotary brush 11 contact, the band conveyors 31 and 31 of a couple convey the work W to a cross direction so that it may pass through this.

[0048]

The rail 36 of a couple before and after installing on the stand 3, and the work width adjustment mechanism 37 which consists of 36 grades are formed in the work carrying means 12.

The work width adjustment mechanism 37 makes one move right-hand side band conveyor 31, drive motor 32, power transmission device 33, and guide 34 to a longitudinal direction.

According to the work width adjustment mechanism 37, the work carrying means 12 can convey various kinds of works W in which the width of a longitudinal direction differs.

[0049]

As a kind of work W, a printed circuit board, a liquid crystal glass substrate, a flexible substrate, a ceramic substrate, a plastic sheet, a liquid crystal display panel, a vacuum tray, a lens, a light guide plate, a film, paper, etc. are mentioned, for example.



[0050]

The conductive fiber which has a diameter of about several 10 micrometers, for example in the peripheral surface of the brush body which the rotary brush 11 consists of what is called an electric conduction brush, and consists of an approximate circle pillar is transplanting hair. The hair transplantation portion contacts the surface of the work W rotationally, and the rotary brush 11 is removed so that dust adhering to the surface of the work W may be raked out, and it discharges the static electricity of the surface of the work W.

[0051]

The rotary brush 11 is constituted by the height adjustment device which consists of a ball plunger etc. which carried out figures omitted abbreviated that it should correspond to the thickness from which the work W differs so that adjustment of the position of a sliding direction, i.e., height, (gap) is possible. The rotary brush 11 has extended for a long time in the longitudinal direction so that it can respond to the wide work W. And right-and-left each ends 41 and 42 of the protuberance form of the rotary brush 11 are formed as each input part of the brush pivot means 13 and the brush movement means 14.

[0052]

That is, the rotational motion power of the brush pivot means 13 is inputted from the left edge part 41, and the rotary brush 11 rotates to the circumference of an axis, and the power of the straight-line motion of the brush movement means 14 is inputted from the right end section 42, and it moves to shaft orientations. The right end section 42 of the rotary brush 11 is connected with the slide shaft 101 of the brush movement means 14. This slide shaft 101 is supported by the 1st supporting stand 51 fixed to the common base 16 so that an attitude is pivotable and possible.

[0053]

The brush pivot means 13 has the motor 61 for rotation used as a driving source, and a transmitting power means 62 to transmit rotation of the motor 61 for rotation to the rotary brush 11, and to permit the attitude of the rotary brush 11. The motor 61 for rotation comprises a DC motor and a stepping motor with a commutator and a brush. The motor 61 for rotation is fixed to the 2nd supporting stand 52 fixed to the common base 16 via the bracket 53, and the output shaft 64 is the rotary brush 11 and the same axle.

[0054]

The principal axis 72 in which the means 62 of transmitting power was connected with the output shaft 64 of the motor 61 for rotation via the coupling 71, it comes out with the principal axis 72, the spline boss 73 formed in one, and the castellated shaft 74 which it fitted into the spline boss 73, and fixed the left edge part 41 of the rotary brush 11 to the inside, and is constituted. The spline boss 73 is supported by the 2nd supporting stand 52 pivotable via the bearing 76.

[0055]

The square-shaped spline (refer to drawing 5) which consists of the spline boss 73 and the castellated shaft 74 is united by rotation of the motor 61 for rotation, and rotates. By this square-shaped spline, the rotary brush 11 with which the torque of the motor 61 for rotation was transmitted rotates, and the attitude of the shaft orientations of the rotary brush 11 by the brush movement means 14 is permitted [ be / it / under / that rotation / setting ]. Of course, it may replace with a square-shaped spline and a ball spline may be used.

[0056]

Change rotational movement of the motor 81 for an attitude used as a driving source, and the motor 81 for an attitude into the advance and retreat movement of the rotary brush 11, and the brush movement means 14

transmits it, and it has the reciprocating block slider crank mechanism 82 (means of transmitting power) which permits rotation of the rotary brush 11. The motor 81 for an attitude comprises a stepping motor as well as the motor 61 for rotation etc., and is being fixed to the motor base 84 formed on the common base 16.

[0057]

The slider part (it connects) 91 in which the reciprocating block slider crank mechanism 82 holds the right end section 42 of the rotary brush 11 pivotable, It has the connecting rod part 93 by which one end was connected with the slider part 91 via the connecting pin 92, and the crank part 94 with which the end of another side of the connecting rod part 93 was connected, and the output shaft 86 of the motor 81 for an attitude was connected.

[0058]

the slider part 91 is allocated on the rotary brush 11 and the same axle, comes out with the slide shaft 101 which fixed the right end section 42 of the rotary brush 11 to the inside, and the joint part 102 which connects the slide shaft 101 and the connecting rod part 93, and is constituted. Via the bush 103 and the bearing 104, the left end side where the slide shaft 101 fixed the rotary brush 11 as shown in drawing 6 is supported by the 1st supporting stand 51 so that an attitude is pivotable and possible.

[0059]

it comes out with the cylindrical body 111 located between the slide shaft 101 and the bearing surface of the bearing 104, and the flange 112 of the flange shape which stands in a row in the body 111 at one, and contacts the end face of the bearing 104 from the outside, and the bush 103 is constituted. And it is provided in the outside of the flange 112 and the bush 103 is in the \*\*\*\*\* state between the slide shaft 101 and the bearing 104 by the Bush presser foot 114 fixed to the 1st supporting stand 51.

[0060]

The bearing 121 to which the joint part 102 supports the right end side of the slide shaft 101 pivotable as shown in drawing 7, It has the slide shaft 101 and the main part 124 of a splice which extends on the same axle from the end face of the bearing holder 122 incorporating the bearing 121, the mounting base 123 by which bolt immobilization was carried out at the bearing holder 122, and the mounting base 123. The main part 124 of a splice has the forked yoke 128 in the tip side, and this yoke 128 is connected with the end of the connecting rod part 93 in the shape of an adjustable joint via the connecting pin 92.

[0061]

By such composition of the joint part 102, can make the slide shaft 101 move to shaft orientations via the connecting rod part 93, and. Transfer of the torque to the connecting rod part 93 of the slide shaft 101 which the rotary brush 11 and really rotates can be intercepted. As shown in drawing 5 or drawing 9, the bearing holder 122, the mounting base 123, and the main part 124 of a splice may consist of single members.

[0062]

The crank part 94 has the axis of rotation 131 which connected the right end section of the connecting rod part 93, and the eccentric plate 132 which was made to carry out eccentricity of the axis of rotation 131 to the output shaft 86 of the motor 81 for an attitude, and was fixed, as shown in drawing 5 and drawing 8. The output shaft 86 is fixed to the end face central part on the back side, and, as for the eccentric plate 132, the linear shape crevice 151 which passes along the center is established in the end face on the side front. The crevice 151 is equipped with the adjusting block 152 which fixed the axis of rotation 131 so that a slide is possible.

[0063]

In the both-ends side of the sliding direction, the adjusting block 152 comprises the outside of the eccentric plate 132 so that screw fixation in this is possible, and the end face which intersects perpendicularly with a sliding direction consists of the outsides of the eccentric plate 132 so that screw fixation in this is possible. The part cuts off the eccentric plate 132 the corners, and it is formed so that the head of a screw thread can be received, so that the end face which intersects perpendicularly with the sliding direction of the adjusting block 152 can certainly be fixed. The eccentricity of the axis of rotation 131 over the output shaft 86 can be adjusted with adjustment of the slide position of this adjusting block 152.

[0064]

That is, the adjustment device 155 which can adjust the crank length used as the distance between connection of the connecting rod part 93 and the motor 81 for an attitude is constituted by the eccentric plate 132, the crevice 151, the adjusting block 152, and the screw thread. The adjustment device 155 built into the crank part 94 enables it to adjust the amount of attitudes of the rotary brush 11 (amplitude) corresponding to the classification of the work W.

[0065]

Here, with reference to the typical sectional view of drawing 9, the advance and retreat movement of the rotary brush 11 is explained briefly. The motor 81 for an attitude carries out a drive revolution, and when it will be in the state which the eccentric plate 132 carries out half rotation through a process (b) from the initial state shown in (a), and shows in (c), the maximum straight-line motion of the rotary brush 11 is carried out rightward. At this time, the castellated shaft 74, the slide shaft 101, and the joint part 102 which have been arranged on the rotary brush 11 and the same axle carry out a straight-line motion to the rotary brush 11 and one. And if the motor 81 for an attitude carries out a drive revolution further and the eccentric plate 132 carries out half rotation, the maximum straight-line motion of the rotary brush 11 grade will be carried out leftward, and it will return to the original state of (a) through a process (d).

[0066]

By as mentioned above, the thing which is made to drive the brush pivot means 13 and the brush movement means 14 synchronizing with the work carrying means 12 according to the dust stripper 1 of this embodiment. The rotary brush 11 can be made to move to the shaft orientations to the work W conveyed, making the rotary brush 11 contact the surface rotationally. Therefore, dust adhering to the work W is more suitably and fully removable.

[0067]

Replace with the composition which conveys the work W of this embodiment, and the work W is set to the prescribed position by immobilite, On the other hand, as the rotary brush 11 is moved in the direction which intersects perpendicularly with the moving direction, making the rotary brush 11 move, dust elimination operation may be performed about the surface whole region of the work W. In this case, for example, provide the moving base which supports the brush movement means 14 and the brush pivot means 13 to one, and it synchronizes with the brush pivot means 13 and the brush movement means 14, What is necessary is just made to move this moving base by ball screw drive etc. in one way (to transportation direction of the above-mentioned work W).

[0068]

Or the rotary brush 11 is conversely replaced with the composition made to move positively, and it may be made to move the work W in the direction (namely, moving direction of the above-mentioned rotary brush 11) which intersects perpendicularly with this transportation direction to the rotary brush 11 arranged in the

prescribed position, conveying the work W. In this case, for example, the moving base which supports the work carrying means 12, and the fixed base which supports the brush pivot means 13 are provided. And what is necessary is just to move a moving base in the direction which intersects perpendicularly with the transportation direction of the work W by the work carrying means 12 by ball screw drive etc. synchronizing with the brush pivot means 13 and the work carrying means 12.

[0069]

Namely, what is necessary is just to have composition to which the rotary brush 11 under rotation is moved relatively to X-Y shaft orientations to the work W. When these two directions of relative displacement take an example by the ease of attaching of the various constituent means in the dust stripper 1, as described above, they are preferred [ by classification of the work W, etc., also when cross directions other than direction crossing at a right angle are preferred, it thinks, but ]. [ of direction crossing at a right angle ]

[Work example 2]

[0070]

Next, with reference to drawing 10, the dust stripper 1 of this invention concerning the 2nd working example is explained focusing on a point of difference with the 1st working example. The contour shape of the work W used for this example is disc-like.

For example, they are disc media, such as a silicon semiconductor wafer and CD (Compact Disk).

Therefore, in the 2nd working example, it replaced with the work carrying means 12 of the 1st working example, and has the work pivot means 171 which rotates the work W to the circumference of the axial center 173.

[0071]

Although it carried out figures omitted abbreviated [ of the work pivot means 171 ], it has a rotating shaft arranged on the medial axis 173 of the work W, and the same axle, and the rotating table attached to the tip part of a rotating shaft, and is constituted on the rotating table so that installation of the work W is possible. And the rotary brush 11 is arranged above the work pivot means 171, and the brush pivot means 13 and the brush movement means 14 above-mentioned to the rotary brush 11 are connected.

[0072]

the rotary brush 11 adheres to each ends 41 and 42 on either side, the shaft part 181 of one, and the shaft part 181, and a conductive fiber comes out with the brush body 182 which transplanted hair to the peripheral surface, and it is constituted. As the shaft part 181 straddled the medial axis 173 of the work W, it has extended. The brush body 182 is arranged so that it may face to the field which exceeded the peripheral part slightly from the central part of the work W.

It moves to the radial direction of the work W by the brush movement means 14 at the shaft part 181 and one.

[0073]

The brush pivot means 13 and the brush movement means 14 are made to drive in the dust elimination operation by the dust stripper 1 of this example synchronizing with rotation of the work W by the work pivot means 171. Then, to the work W under rotation, while the rotary brush 11 rotates focusing on an axial center, it moves to the shaft orientations, and the rotary brush 11 removes the dust which contacted the work W and adhered to the surface of the work W in that case. The surface of the disc-like work W can be continued throughout the by this, and the solvent wiping removal of dust can be performed suitably.

[Work example 3]

[0074]

Next, with reference to drawing 11, the dust stripper 1 of this invention concerning the 3rd working example that is a modification of the 2nd working example is explained. Although each ends 41 and 42 of the right and left of the rotary brush 11 were made into each input part of the brush pivot means 13 and the brush movement means 14 and these each means 13 and 14 have been arranged right and left in the 1st working example and the 2nd working example on both sides of the work carrying means 12 or the work pivot means 171, In the 3rd working example, the power of the brush pivot means 13 and the brush movement means 14 is inputted from one end 42 of the rotary brush 11, and intensive arrangement of these each means 13 and 14 is carried out at one side of the work pivot means 171.

[0075]

The output screw gear 191 with which the means 62 of transmitting power of the brush pivot means 13 adhered to the output shaft 64 of the motor 61 for rotation, it comes out with the input screw gear 192 which meshes with the output screw gear 191, the input screw gear 192, the spline boss 73 formed in one, and the castellated shaft 74 which it fitted into the spline boss 73, and fixed the right end section 42 of the rotary brush 11 to the inside, and is constituted. The spline boss 73 is supported by the receptacle member 193 pivotable.

[0076]

Like above-mentioned working example, if the spline boss 73 and the castellated shaft 74 serve as a square-shaped spline and the spline boss 73 rotates via the output screw gear 191 and the input screw gear 192 in response to the power of the motor 61 for rotation, The castellated shaft 74 and the rotary brush 11 rotate to one with the spline boss 73. The attitude of the castellated shaft 74 by the brush movement means 14 and the rotary brush 11 is permitted [ be / it / under / this rotation / setting ]. The numerals 194 shown in drawing 11 are the guides for position regulating of the input screw gear 192.

Thereby, Bure of rotary brush 11 grade is prevented.

[0077]

The means of transmitting power of the brush movement means 14 comprises the same reciprocating block slider crank mechanism 82 as the above. Namely, the reciprocating block slider crank mechanism 82, Have the slider part 91, the connecting rod part 93, and crank part 94 grade, and the slider part 91, it comes out with the slide shaft 101 connected on the castellated shaft 74 and the same axle, and the joint part 102 which connects the slide shaft 101 and the connecting rod part 93, and is constituted.

[0078]

And the slide shaft 101 is supported by bearing 104 grade pivotable, and the joint part 102, The slide shaft 101 can be made to move to shaft orientations via the connecting rod part 93, and transfer of the torque to the connecting rod part 93 of the slide shaft 101 which the rotary brush 11 and really rotates is intercepted.

[0079]

By thus, the thing made to drive the brush pivot means 13 and the brush movement means 14 also in the dust stripper 1 of this example synchronizing with rotation of the work W by the work pivot means 171. With the rotary brush 11 which contacts the work W rotationally, dust adhering to the surface of the work W is suitably removable.

[0080]

Although he is trying to make the surface of the work W carry out direct contact of the rotary brush 11 in each above-mentioned working example, Even if the rotary brush 11 is a case where the non-contact state 11, i.e.,

a rotary brush, consists and approaches the surface of the work W in few gaps to the surface of the work W, dust of the surface of the work W is removable with the rotary brush 11. According to the classification and the operating environment (atmosphere) of the work W, the motor 81 for an attitude is controlled, it may be made to adjust the attitude speed of the rotary brush 11, the motor 61 for rotation is controlled, and it may be made to adjust the revolving speed of the rotary brush 11.

[0081]

What is necessary is just to establish the power branching means which branches and transmits the power from the motor 61 for rotation to the brush pivot means 13 and the brush movement means 14, when the motor 61 for rotation has composition which serves as the motor 81 for an attitude. For example, when it applies to the 3rd working example, a power branching means, The driving pulley which consisted and established the gap in the output screw gear 191 at the output shaft 64 of the motor 61 for rotation, the driven pulley which was replaced with the eccentric plate 132 of the crank part 94, and was provided, and the belt over which the driving pulley and the driven pulley were built are provided. And what is necessary is just to form the axis of rotation 131 (crankpin) which connects the right end section of the connecting rod part 93 with the position which carried out eccentricity in the center of rotation of a driven pulley.

[0082]

In each above-mentioned working example, although the motor 81 for an attitude was used as an actuator as the brush movement means 14, of course, it can replace with this and an air cylinder etc. can also be used. But when adjustment of the attitude speed of the above-mentioned rotary brush 11, etc. and its convertibility are taken into consideration, composition like this embodiment is preferred.

[Brief Description of the Drawings]

[0083]

[Drawing 1]It is a front view of the dust stripper concerning working example 1 of this invention.

[Drawing 2]It is a right side view of the dust stripper shown in drawing 1.

[Drawing 3]It is a front view expanding and showing the various constituent means of the dust stripper shown in drawing 1.

[Drawing 4]It is a top view of drawing 3.

[Drawing 5]It is an explanatory view showing the composition of the circumference of a rotary brush in detail typically.

[Drawing 6]It is a flat-surface sectional view which judges a part of composition of the circumference of the right end section of a rotary brush, and is shown in detail.

[Drawing 7]It is a half section figure showing the composition of the circumference of the slider part of a brush movement means in detail.

[Drawing 8]It is a perspective view showing typically the composition of the circumference of the crank part of a brush movement means.

[Drawing 9]It is an explanatory view for explaining the advance and retreat movement of the rotary brush by a brush movement means.

[Drawing 10]It is a top view showing typically the dust stripper concerning working example 2 of this invention.

[Drawing 11]It is a top view showing typically the dust stripper concerning working example 3 of this invention.

[Description of Notations]

[0084]

1 ... A dust stripper, 11 ... A rotary brush, 12 ... Work carrying means, 13 ... A brush pivot means, 14 ... A brush movement means, 17 ... Dust collecting means, 41 ... A left edge part (input part), 42 ... A right end section (input part), 61 ... The motor for rotation, 62 [ ... Spline boss, ] ... The means of transmitting power, 64 ... An output shaft, 72 ... A principal axis, 73 74 ... A castellated shaft, 81 ... The motor for an attitude, 82 ... Reciprocating block slider crank mechanism (means of transmitting power), 86 [ ... Connecting rod part, ] ... An output shaft, 91 ... A slider part, 92 ... A connecting pin, 93 94 [ ... The axis of rotation, 132 / ... An eccentric plate, 155 / ... An adjustment device, 171 / ... A work pivot means, 181 / ... A shaft part, 182 / ... A brush body, W / ... Work ] ... A crank part, 101 ... A slide shaft, 102 ... A joint part, 131

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[Translation done.]